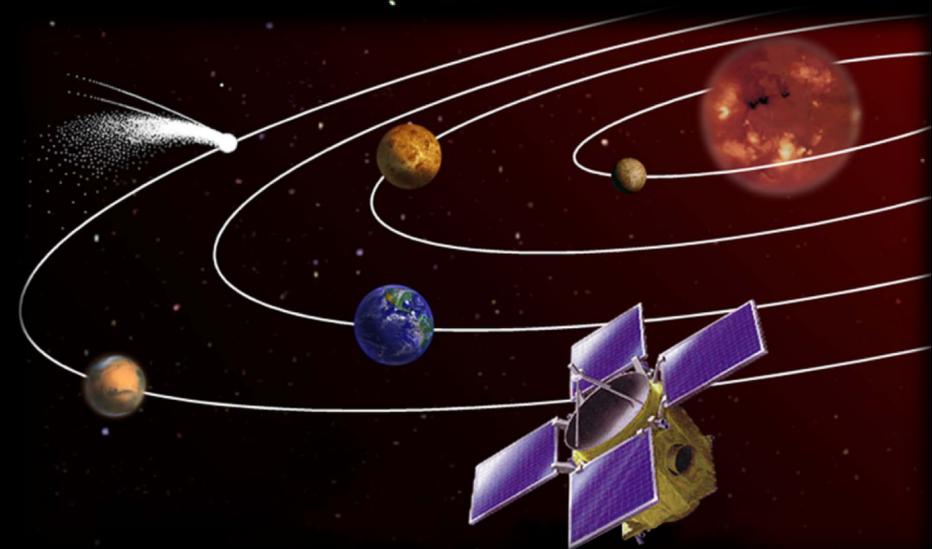
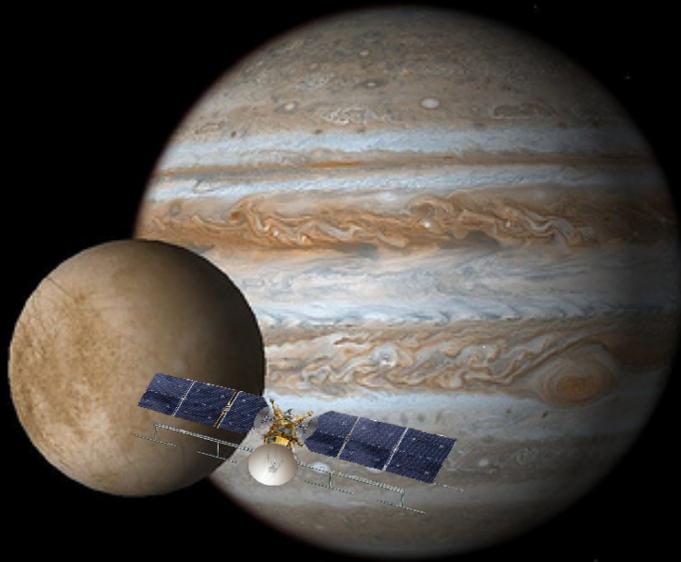


National Aeronautics and
Space Administration



SIMPLEx Preproposal Virtual Conference

Role of the PMPO

Who am I?



James “Kevin” Sykes

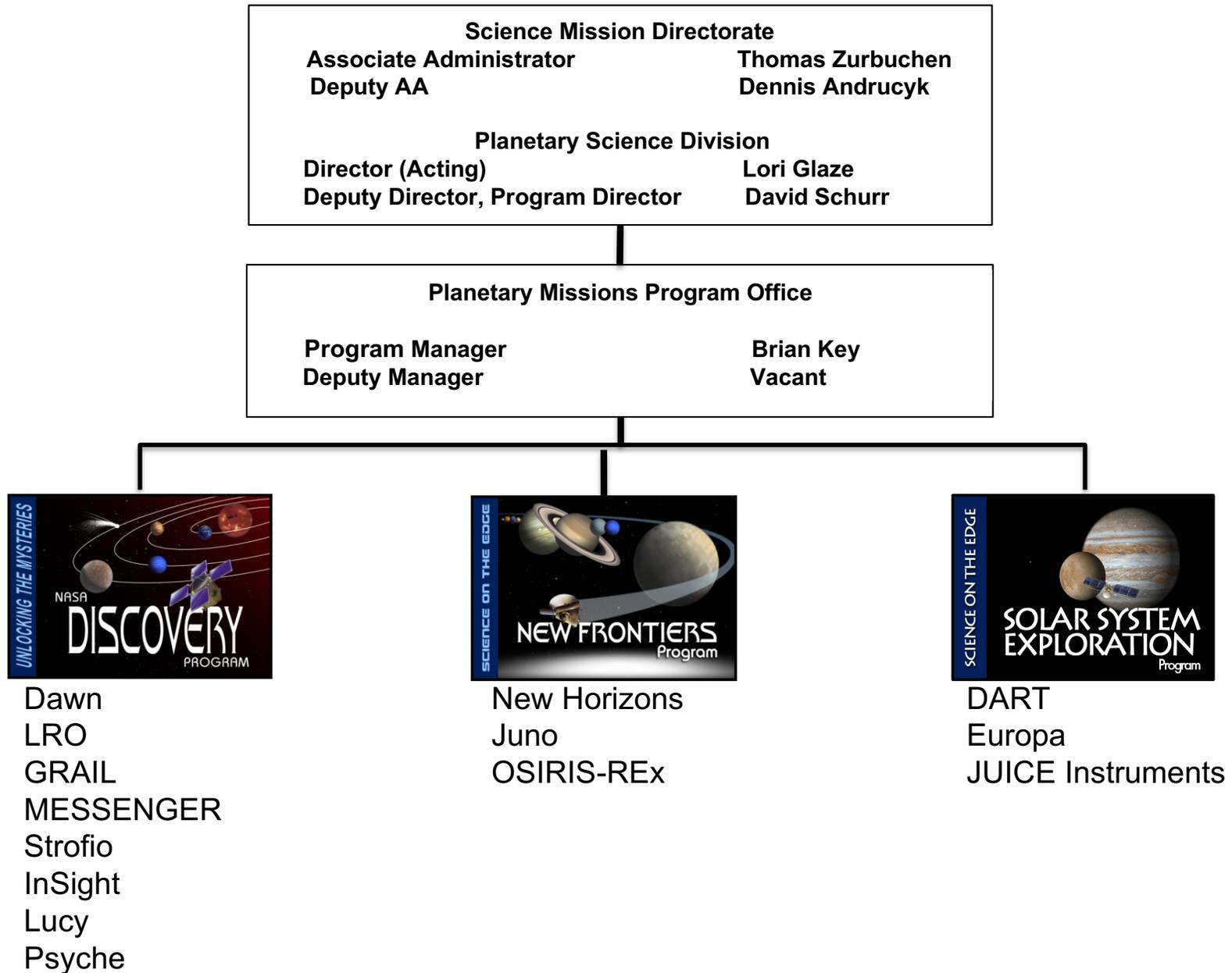
- Mississippi State graduate in Mechanical Engineering
- 20 years total with NASA / Marshall Space Flight Center
- 16 years as a Structural Design Engineer for space payloads
- 2 years as Solar Sail Lead Systems Engineer for the SLS 6U cubesats ~ NEA Scout and Lunar Flashlight
- 2 years as SLS Secondary Payloads Integration Manager ~ responsible for the integration of three 6U cubesats selected by Centennial Challenges Office
- 8 months as Mission Manager in the PMPO (Planetary Missions Program Office). Currently Mission Manager for LRO (Lunar Reconnaissance Orbiter)

Program Office *Background*



- Discovery Program was established in 1992
- New Frontiers Program was established in 2003
- Discovery & New Frontiers (D&NF) PO assigned to MSFC August 2004
- Solar System Exploration Program created in 2014
- Management synergy existed within the Discovery, New Frontiers, and Solar System Exploration Programs driving a program office consolidation effort in 2014
- Program office renamed Planetary Missions Program Office in 2014
- One management structure for all 3 programs
 - One Program Manager
 - Common HQ management team
 - Single Program Plan (Planetary Missions Program Plan)
 - One common set of supporting program office documentation (Risk Management Plan, Safety & Mission Assurance (SMA) Implementation Plan, etc.)

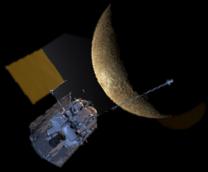
Planetary Missions Program Office



Program Office *Portfolio*

(Sorted by target)

Discovery
 New Frontiers
 Solar System Exploration
 Completed
 Transitioned



MESSENGER



LRO



ASPERA-3
(Mars Express)



Dawn

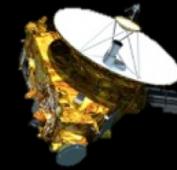
OSIRIS-REx



Juno



Europa

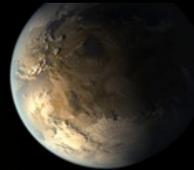


New Horizons



Interplanetary Space

Genesis

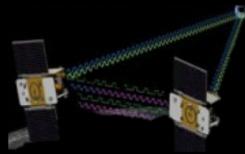


Extra-Solar System

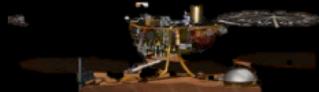
Kepler



Strofió
(BepiColumbo)



GRAIL



InSight



Lucy



Psyche



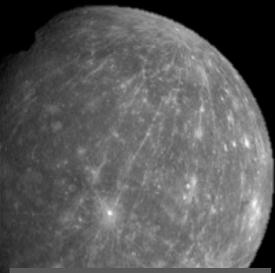
Asteroids



Outer Planets



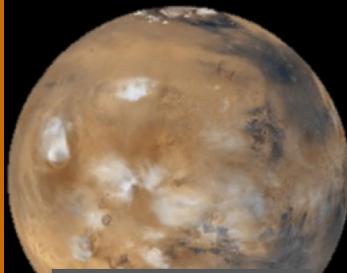
Comets



Inner Planets



Moon



Mars

Strofió
 MESSENGER

GRAIL
 LRO
 LADEE
 Lunar Prospector
 Moon Mineralogy
 Mapper

ASPERA-3
 InSight
 Mars Pathfinder

Dawn
 OSIRIS-REx
 NEAR
 Lucy
 Psyche
 DART

New Horizons
 JUICE
 Juno
 Europa

CONTOUR
 Stardust
 Deep Impact
 EPOXI
 Stardust-NExT

Program Office Goal

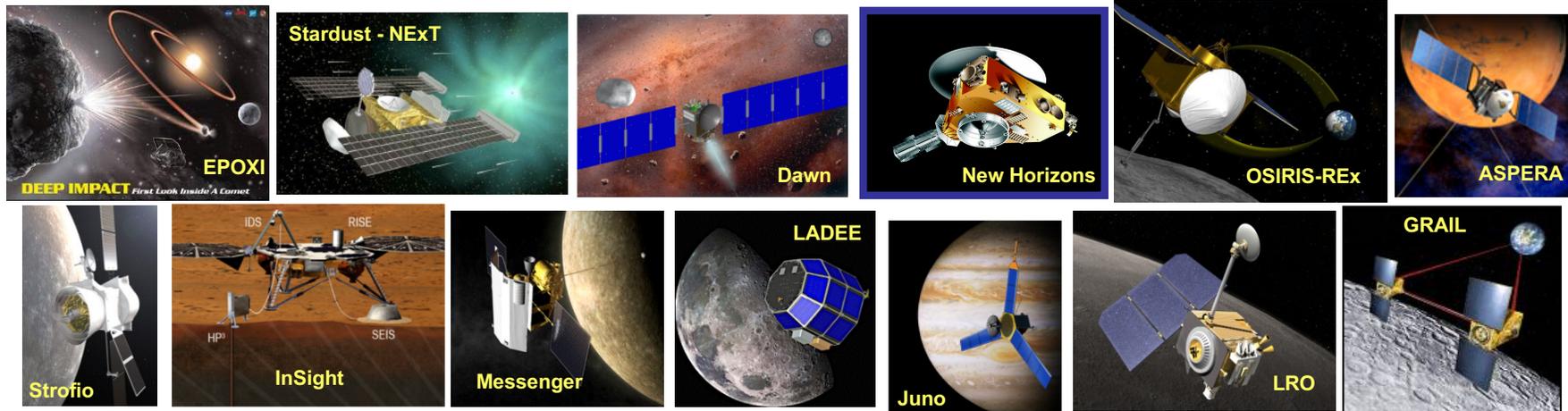


Goal

Enhance the probability of mission success of PMPO projects through independent oversight and insight through all phases of the mission life cycle utilizing a high-powered, effective, and efficient team

Success is.....

- Delivering mission science to the PI and science community
- Ensuring the implementing organization's success in delivering the spacecraft on cost and schedule (meet the launch date and cost cap)
- Meeting the program launch frequency for science missions



Program Office *Primary Responsibility*



- **Implement 7120.5 Program Management functions**
 - Split responsibility between the Planetary Science Division (PSD) Program Director and MSFC Program Manager
 - Program Manager involvement dependent on mission selection
 - Announcement of Opportunity (AO) selected missions; involved in Phases B-F (Science Office for Mission Assessments (SOMA) supports HQ in earlier phases)
 - Directed missions; involvement begins in Pre-Phase A and continues through Phase F
- **Perform oversight and insight of projects (budget, schedule, technical and risks):** When, where and how deep to penetrate determined by assessment of risks and modulated by available budget
- **Manage program budgets**
 - Independently assess project performance to plan
 - Ensure projects receive required funding per plan
 - Manage Planning, Programming, Budgeting and Execution (PPBE) process for projects within the programs and provide integrated assessment/recommendation to PSD
- **Administer contracts:** Execute Task Agreements with JPL, perform Contracting Officer Representative (COR) function on SwRI & APL missions, and execute contracts with Principal Investigator (PI) institutions

How will the Program Office help you?



Taken from SALMON-3 PEA...

- Proposals submitted in response to the PEA will be evaluated based on the entire proposed flight project lifecycle and selected for flight through a two-step competitive process.
 - As the outcome of the first step evaluation, NASA intends to fund one or more SCM (Small Complete Mission) investigations to proceed to a twelve-month Phase A/B study concluding with a preliminary design review (PDR).
 - ✓ PMPO will offer oversight as the SCMs proceed to PDR.
 - In the second step, NASA will conduct an evaluation of the Phase A/B PDR results. From this evaluation, NASA expects to select one or more of the funded SCMs to proceed into implementation.
 - ✓ PMPO will provide the SCM with a Mission Manger
 - ✓ Perform oversight and insight of projects (budget, schedule, technical and risks)

Process leading through PDR



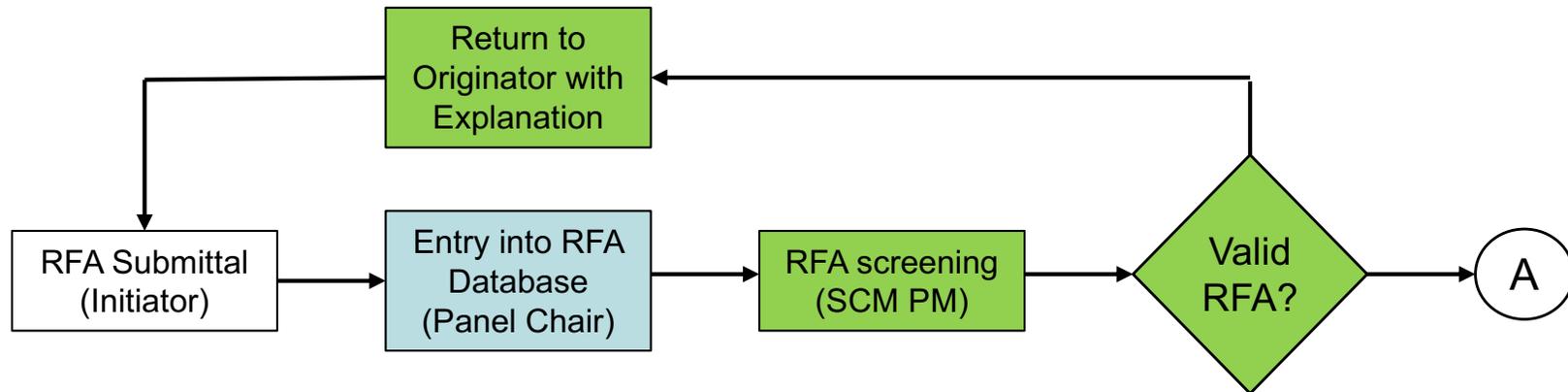
- The PMPO review process manager (that's me!) will formulate a 6 to 7 member Review Panel with experts related to SCM subsystems.
- Immediately after being notified of selection, the SCM would perform a kick off meeting at their site which would be a meet and greet between the SCM and the PMPO review process manager and the Review Panel. Also would discuss the overall scope of the SCM and outline the upcoming review process including the upcoming technical Mission Concept Presentation, subsystem peer reviews, and the Preliminary Design Review (PDR). Estimate this at 2 days duration.
- The SCM would follow the kick off meeting with a Mission Concept Presentation at their site. Review Panel members would attend to better understand technical objectives of the SCM and its subsystems. Although this is not a review, so there are no actions or Request for Action's (RFA), comments and feedback from the Review Panel will be documented and provided to the SCM. Estimate this at 2 days duration.

Process leading through PDR



- As a means to better equip the SCM to be prepared for the PDR, there will be a series of informal Peer Reviews held by the SCM that occur at the SCM's site which will be formatted to focus on each of the critical subsystems. The corresponding Review Panel member would support the specific peer review. Comments, recommendations, and lessons learned will be voiced to the SCM during these peer reviews.
- These Peer Reviews are meant to be a means of reviewing the designs and offering up questions and comments during the design phase prior to PDR. No formal documentation or RFA's will be used during Peer Reviews. Comments will be captured and relayed to the SCM.
- After the series of Peer Reviews, the SCM will conduct a PDR that will allow the Review Panel to offer RFA's that will be documented and followed until closed. The entrance and success criteria of the PDR will follow NPR 7123.1B (Appendix G).

PDR format for collecting RFA's



- Participants in the PDR will review the PDR data package and enter RFAs during the RFA generation period as specified in the PDR schedule.
- RFA submittal shall be accomplished through any of the Review Panel members or the SCM PM.
- Before RFA is electronically logged, the Review Chair or the SCM PM will verify that mandatory fields have been completed and will inform the initiator of any deficiencies.
- Panel Chair will log the RFA into a spreadsheet and relay to SCM PM.
- Upon logging an RFA, the SCM PM will assign it a tracking number.

Assumptions



- The SCM is facilitating the Kick-Off meeting, the Mission Concept Presentation, each of the Subsystem Peer Reviews, and the PDR. All of which would be held at their location.
- The SCM will be responsible for identifying at least 2 peers for each of the planned Subsystem Peer Reviews (at the time of the Mission Concept Presentation) and working out the logistics to have those peers present for each of the Subsystem Peer Reviews. The PMPO will provide one of their own subsystem experts (from the Review Panel) to attend each Subsystem Peer Review.
- The PMPO will be seen as observers during the Subsystem Peer Reviews offering comments and lessons learned as necessary to promote the design towards a PDR level.
- Performing the Peer Reviews is recommended as a means to assist the SCM in their development of their spacecraft so that it does have a successful PDR. A successful PDR is necessary for a future down selection. If an SCM chooses to not perform the Peer Reviews there is a greater risk of a non-successful PDR.

Typical content to include in your Preliminary Design Review briefing



Planetary Missions
Program Office

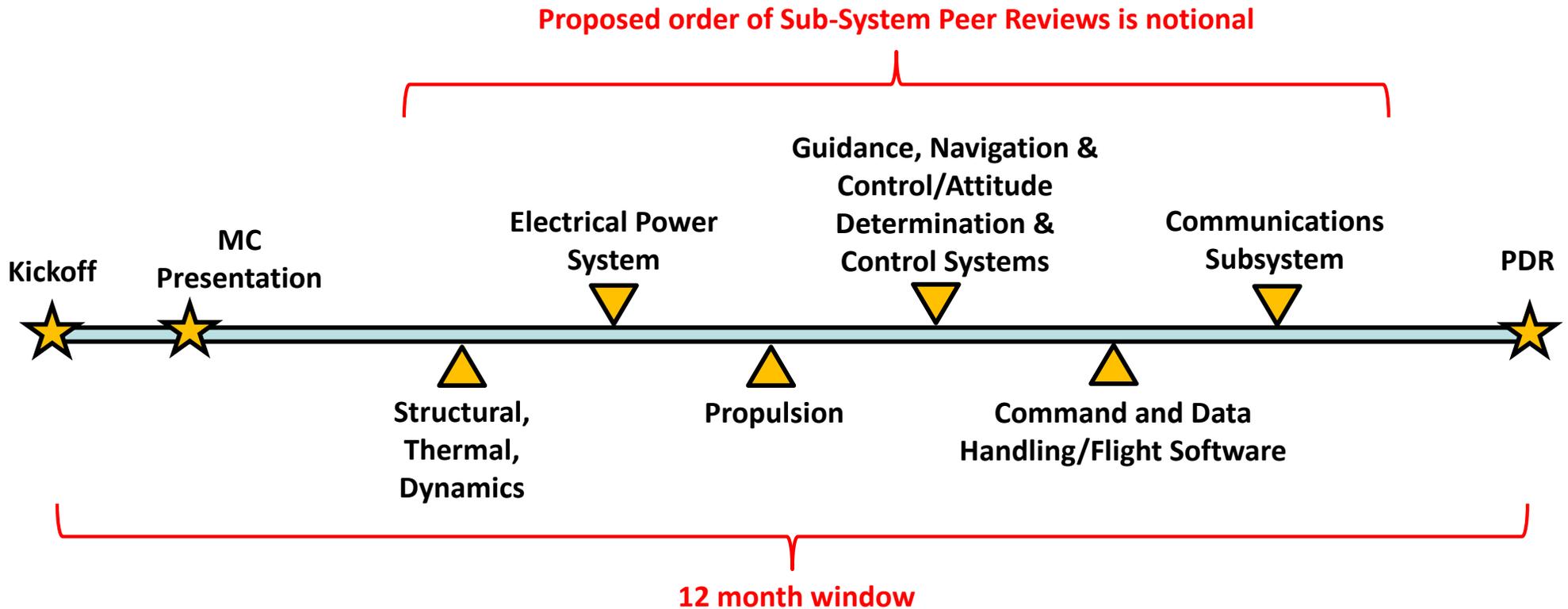
PDR Review Outline:

1. Overview
 - 1.1. Mission Objectives
 - 1.2. Concept of Operations
 - 1.3. System Level Design Description
 - 1.4. Requirements
 - 1.5. Delivery and Environments
 - 1.6. Key Mission Risks
2. Implementation Plan
 - 2.1. Implementation and Verification
 - 2.2. Reliability and Durability Approach
 - 2.3. Schedule
3. Ground Systems and Mission Operations Design, Verification & Validation
4. Subsystems Design, Verification & Validation
 - 4.1. Communications Subsystem**
 - 4.2. Electrical Power System**
 - 4.3. Command and Data Handling/Flight Software**
 - 4.4. Guidance, Navigation & Control/Attitude Determination & Control Systems**
 - 4.5. Structures, Dynamics, and Thermal**
 - 4.6. Propulsion**
 - 4.7. Payload Instruments

Peer
Reviews



Time-line of events



Each Peer Review will be scheduled to last 2 days with part of one day used for tour of facility and hardware demonstration

The Peer Reviews are meant to be a means of reviewing the designs and offering up questions and comments during the design phase prior to PDR. No formal documentation or RFA's will be used during Peer Reviews. Comments will be captured and relayed to the SCM.

Review Panel Personnel & Fields of Expertise



| Review Member | Organization | Role for Reviews |
|---------------|--------------|---|
| Kevin Sykes | MSFC | Chair; Review process management; Systems Engineering |
| TBD | TBD | Propulsion |
| TBD | TBD | Structural, Dynamics, & Thermal |
| TBD | TBD | Electrical Power Systems |
| TBD | TBD | GNC / ACS |
| TBD | TBD | Flight Software |
| TBD | TBD | Communications |

Post PDR



- After PDR, the PMPO will make a recommendation as to the readiness of the SCM's based on their PDR packages. One or more of these SCM's will then be given the authority to proceed on to CDR and to implementation.
- Requirements will be driven by NPR 7120.5E, NASA Space Flight Program and Project Management Requirements document and by the launch vehicle that is selected.
- Integration into the vehicle will more than likely be accomplished by LSP.
- PMPO will provide the SCM with a Mission Manger who will provide oversight and insight of the project (budget, schedule, technical and risks)

